Digital Divide between Teachers and Students in Urban Bangladesh

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DIGITAL DIVIDE BETWEEN TEACHERS AND STUDENTS IN URBAN BANGLADESH

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Abstract

Telecom boom since 2000 and 'Digital Bangladesh' campaign since late 2008 created significant nationwide hype, resulting rapid increase in the use of digital devices. While studies are being conducted to use the ability of "power users of technology" for reducing digital divide, there is hardly any data available on them in Bangladesh context. A study was conducted to study the digital divide and ICT usage pattern among the urban students and teachers of schools and colleges in Dhaka, the capital of Bangladesh. About 75 students enrolled in probability and statistics course of Independent University, Bangladesh (IUB) in autumn 2009 participated in conducting survey activities. Total 33 academic institutes were south for approval and 11 could be surveyed before the Christmas and annual recess. Responses from 6 other academics institutes were collected from the personal networks of students.

A questionnaire was developed based on initial semi-structured interview with randomly selected students from these academic institutions. The 41-question questionnaire was developed to study the usage of computer, internet, mobile and other handheld devices, radio, television and CD/DVD players. A slightly different questionnaire was developed for teachers. 965 students and 185 teachers participated in the survey. Among student respondents 37% were from English Medium and 63% from Bangla medium institutions. From class VI –XII, the survey group represent the secondary and higher secondary education level in Bangladesh. Male respondents were 53% and female 43%, remaining are missing. Responses collected using paper-based questionnaires were put on a learning management system's (LMS) questionnaire survey module.

Irrespective of type of ICT device higher percentage of English medium students 'own' and know 'how to use' compared to Bangla medium students. Significantly higher percentage of students can use and own desktop, laptop, cellphone, iPOD and MP3 player. While teachers mostly use computers for work (73%), study (45%) and listening music (34%), students use for playing games (63%), listening musing (62%) and study (44%). 69% teachers and 66% students use social networking sites. Top three online activities for students are music (53%), games (47%) and chat (42%), for teachers these are study (55%), chat (40%) and music (33%). Students use more mobile features than teachers. Interestingly 59% teachers and 61% students have more than one SIM card. More than 50% of students and teachers use mobile for listening radio. 55% or more teachers and 67% or more students 'own' a desktop. 90% or more teachers and 74% or more students 'know how to use' desktop computer. Further study is required to gain insight into digital divide and associated reasons in four different educations systems in Bangladesh.

Keywords: digital divide, ICT readiness and ability, digital Bangladesh, urban Bangladesh, teachers and students

1. INTRODUCTION

Peoples Republic of Bangladesh is taking strong initiatives to achieve the goal of "Digital Bangladesh by 2021" as part of "Charter of Change" declared by the present ruling party Awami League for the 9th Parliamentary Election [1]. Government, private, corporate, public private partnership, donor projects, institute level changes and individual efforts are initiated to include Information Communication Technologies (ICTs) for effective utilization of "Digital Bangladesh" movement[1] [2] [3]. However, socio-economic condition of this large rural & agrarian country gets only 47% power supply from national grid with per capita consumption of 156 Kwh [4], among 11 years and above 34.2% are non-literate[5], lack physical access to ICTs, has social class gaps and bias, family resistance etc. These are barriers of such initiatives. Urban areas, especially, the capital Dhaka and surrounding areas are significantly different from the rest of the country in terms of power supply and consumption, literacy rate, socio-economic condition and access to ICT. About 76.90% population living in rural areas [6] being 'disadvantaged', moves the focus of ICT in education towards ICT 'inclusion', rather than 'advancement'. However, the potential of urban 'advantaged' community

requires attention for 'advancement'. This study takes the point of departure by questioning whether or not the teachers and students in urban Bangladesh, especially those in the capital have 'access' to ICTs and believe that they 'can use'. This paper intends to convince decision makers to consider the potential of the study population. The frequently debated issue of digital divide between teachers and students are discussed in section 4.

This paper is organized in the following manner. It summarizes the education system of Bangladesh and directs towards the scope of work, describes the context and states the objectives, and reviews related research to establish the standpoint. The methodology section describes the approaches of data collection and analyses. Analyses show digital divide among the teachers and students of two different educations systems. Prospective scopes of future work are provided in the last section of the paper.

2. EDUCATION STRUCTURE OF BANGLADESH

Fig.1 shows national education structure. There are four different K-12 education systems, namely Bangla Medium (BM), English Version (EV), Madrassa education (Islamic) and, Technical Vocational Education and Training (TVET), are run by public, private and autonomous bodies. The English medium (EM) education system includes significant number of educational institutes; those follow Cambridge, Edexcel and International Baccalaureate (IB) educational systems. All EM educational institutes are run under private ownership and administration. Absence of single source of overall statistics on these K-12 education systems [7] has made 'ICT in education' a greater challenge.

There are inherent socio-economic divide among the students of different education systems. Typically, EM students come from relatively affluent classes of society as the fees structure is highest among the institutes. TVET and Madrassa education (i.e. Dakhil, Alim etc. as in Fig.1) are usually pursued by students from lower middle or lower economic classes. BM, BV and EM students typically come from middle classes of families, which constitute the highest portion of the population. Dhaka, being the most advantaged and the largest part of 'Urban Bangladesh' contains highest number of institutes among the urban areas. These institutes are assumed appropriate as the study population.

3. OBJECTIVES OF THE STUDY

Physical access, ownership and ability to use ICT devices by teachers and students are prerequisites to effective utilization of ICTs as educational technologies. Dhaka, the capital, has best academic professionals and knowledge seekers who might require little institutional facilitation, motivation and skill to effectively utilize and contribute largely. In this context the specific objectives are:

- to explore the physical access, ownership and ability to use ICT
- to analyse the digital divide between teachers and students
- to analyse the differences (possibly) contributed by two education systems or socio-economic background associated with the systems
- to gain basic understanding of the readiness and ability to initiate further study
- to catch the attention of the decision makers to take strong initiatives to capitalize existing readiness and ability

4. REVIEW OF LITERATURE

The Rural Electrification Board (REB) consumes 37.73% electricity among the 47% of population who are within electricity supply coverage of Bangladesh Power Development Board (BPDB)[4]. Therefore, approximately 80% of rural population consumes approximately 20% of electricity (17.73%). Therefore, the urban educational institutes especially those in Dhaka are consuming electricity for various ICT use in one way or another. Therefore, it might be appropriate to suggest the school authority and students' family to consider the opportunities.

Organization for Economic Co-operation and Development (OCED) [9] defines digital divide as "the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities. The digital divides reflect various differences among and within countries". Digital divide can also occur due to socio-economic factors, geographical, educational, attitudinal, and generational or age factors, or even due to physical disabilities [10]. This paper explores the divide between teachers and students, and the divide between English and Bangla medium institutes.

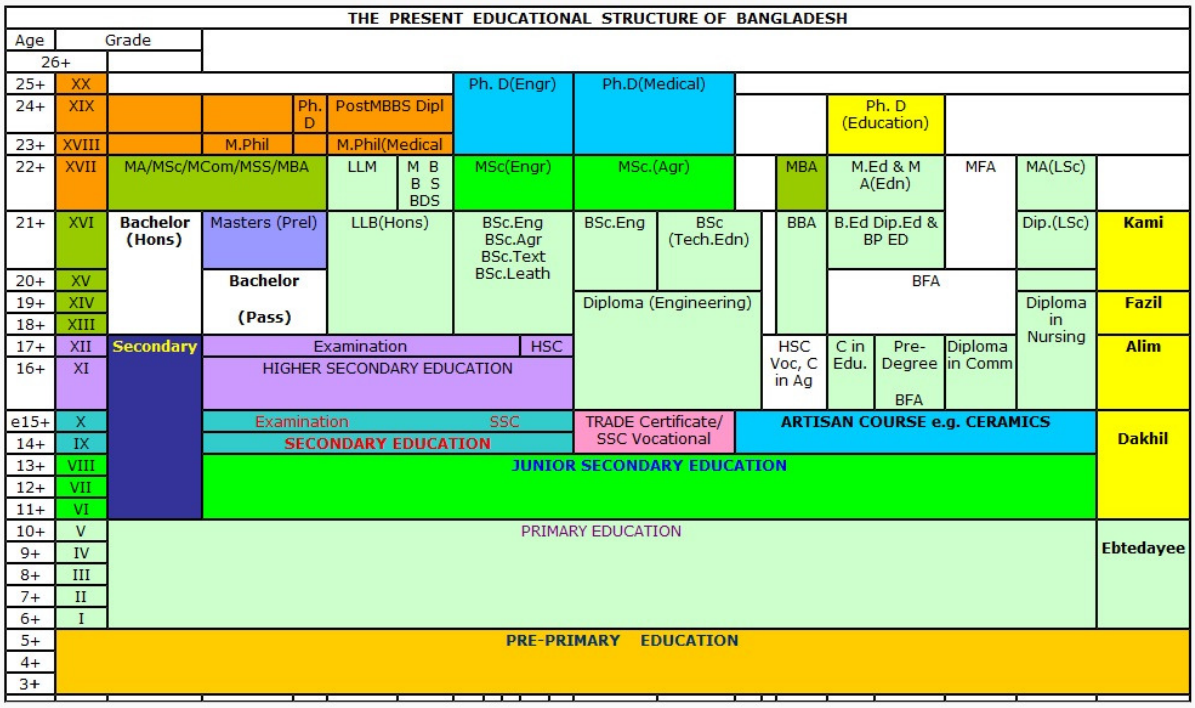

Fig. 1 Education Structure of Bangladesh [8]

The most debated papers in the field of ICT in education rooted to digital divide, are Marc Prensky's papers [11] and [12] on "digital natives, digital immigrants". As Prensky coins these terms, goes "What should we call these "new" students of today? Some refer to them as the N-(for Net)-gen or D-(for digital)-gen. But the most useful designation I have found for them is Digital Natives. Our students today are all "native speakers" of the digital language of computers, video games and the Internet. So what does that make the rest of us?..... Digital Immigrants" [11]. The digital immigrants learn the "native's" language and adapt to their environment, yet has their own "digital immigrant accent" with strong association with the past language and practices. For example, digital immigrants prints a document to edit it, brings people to office to see an interesting website. "Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language" [11]. In [12], Mark attempted to convince referring that neurobiologists and social psychologists agree that brains change with new inputs and thinking pattern changes depending on experience. Life's experience on watching TV, following high speed channels, playing video games etc. bring in changes biologically and psychologically. The foundations of Prensky's claim in [11], [12] are questioned with significant empirical evidences and arguments in [13], [14], [15], [16], [17], [18], [19]. Prensky [12] directs to change the teaching-learning system to utilize the skill sets gained by the students while playing games, watching TV, or leisure time ICT activities. The skill sets associated with daily use and the skills set for teaching learning are significantly different [20]. Strongly agreeing to the difference, this study focuses at the basic baseline data associated with access, ownership and ability to use ICT device.

[21] summarize "basic model of innovation" from [22] stating that "Firstly, any new form of behaviour must yield benefits that outweigh the costs or disadvantages (= "readiness" or R). Secondly, the new form must be legitimised, i.e., it must be culturally (ethically, morally) acceptable (= "willingness" or W). Thirdly, there must be adequate means, though not necessarily of a technical nature, to implement the new form (= "ability" or A). Moreover, the three preconditions must be met jointly for the new behavioural form to succeed. Hence, a success S can be expressed as $S = R \cap W \cap A$. This expression furthermore defines a bottleneck model, since the failure of satisfying one condition prevents the innovation from breaking through, even if the other two preconditions are met." These conditions have to be met for effective use of ICTs as educational technology. The 'physical access' [23] to device is a very small part of "readiness." The term 'ability to use' used in this paper reflects only the technical ability to use the device in some way only and does not refer to the fulfilment of criteria of "ability or A". Because, ability to use ICTs can be further studied using Bloom's taxonomy as described by [24].

5. RESEARCH METHODOLOGY

The research is primarily an outcome of a questionnaire survey preceded by interviews. The analysis is conducted using tabular and graphical methods of descriptive statistics, by analyzing responses of teachers and students.

About 75 students enrolled in probability and statistics course of Independent University, Bangladesh (IUB) in autumn 2009 participated in conducting survey activities. Total 33 academic institutes were south for approval and 11 could be surveyed before the Christmas and annual recess. Responses from 6 other academics institutes were collected from the personal networks of students. Responses collected using paper-based questionnaires were put on a learning management system's (LMS) questionnaire survey module. The questionnaire was developed based on initial semi-structured interview with randomly selected 10 students and 5 teachers from these academic institutions. The 41-question questionnaire was developed to study access, ownership and usage of computer, internet, mobile and other handheld devices, radio, television and CD/DVD players. A slightly different questionnaire was developed for teachers. 965 students and 185 teachers participated in the survey. Based on LMS records, Tab. 1 summarises the study units of English and Bangla Medium institutes. Gender specific details is reported with male (M), female (F) and missing response (X).

Tab. 1 Study Units

	Name of Institution	Teachers			Total	Students			Total
		M	F	X		M	F	X	
Bangla Medium/Version	Adamji Cantonment College	-	-	-	-	59	16	2	77
	Bacha School	4	5	0	9	78	45	3	126
	Cambrian School and College	27	26	7	60	-	-	-	-
	Central Government High School	-	-	-		10	5	10	25
	Dhaka Commerce College	16	4	0	20	0	2	0	2
	Dhaka Residential Model College	17	7	2	26	2	-	-	2
	Viqarunnisa Noon School and College	-	-	-	-	-	199	0	199
	Kalachandpur High School and College	-	-	-	-	14	12	12	38
	Gulshan Commerce College	4	2	0	6	-	90	0	90
	National College, Badda	5	7	3	15	38	8	0	46
English Medium	Dhanmondi Tutorial	2	18	4	24	74	32	5	111
	Bangladesh International Tutorial	-	-	-	-	4	1	0	5
	Play Pen	3	18	0	21	61	68	3	132
	Oxford International School	0	3	1	4	77	24	5	107
	Others	-	-	-	-	3	2	0	5
	Total	78	90	17	185	420	504	41	965
	Percentage	42	49	9	100	44	52	4	100

6. DATA ANALYSES

Among 185 teacher respondents 42% (78) are male, 49% (90) are female and 9% (17) did not respond to gender question. Out of 995 student responses 44% (420) are male, 504 (52%) are female and 4% (41) has missing value in gender question. Excluding the missing value, male and female responses might be claimed sufficiently balanced and significantly representative. Furthermore, gender specific analysis has not been conducted. In the following discussions ICTs refer to desktop, laptop, internet, portable digital assistant (PDA), cell phone, television, radio, iPOD, MP3 player and CD/DVD players.

6.1 Digital Divide between English Medium and Bangla Medium Students

Fig. 2 shows that irrespective of type of ICT device higher percentage of English medium (EM) students know 'how to use' compared to Bangla medium (BM) students. It would be important to examine whether language of instruction or other factors are associated in justifying this difference. Fig. 4 shows that except cell phone (3% difference), higher percentage of EM students 'own' ICT devices than BM students. This difference is probably due to higher percentage of BM students being from grade XI-XII. It was however observed that EM students begin to use personal cell phone much earlier than BM students. Fig. 3 and Fig. 5 show similar difference among teachers, with 2% more BM

teachers using cell phone. The difference between 'know how to use' and 'own the device' is higher among teachers. Therefore, student have higher 'ownership' and 'ability to use' association. 55% or more teachers and 67% or more students 'own' a desktop. 90% or more teachers and 74% or more students 'know how to use' desktop computer.

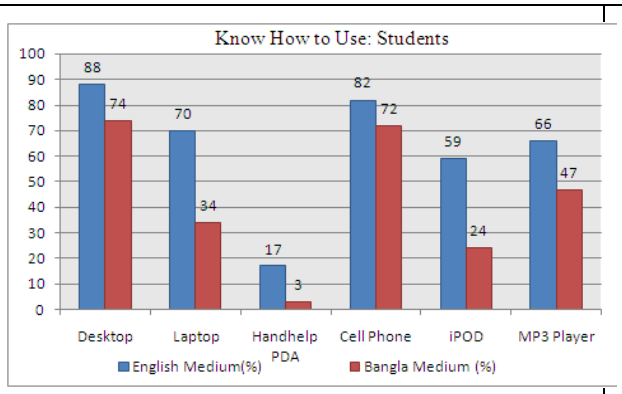

Fig. 2 Students' ability to use ICT devices

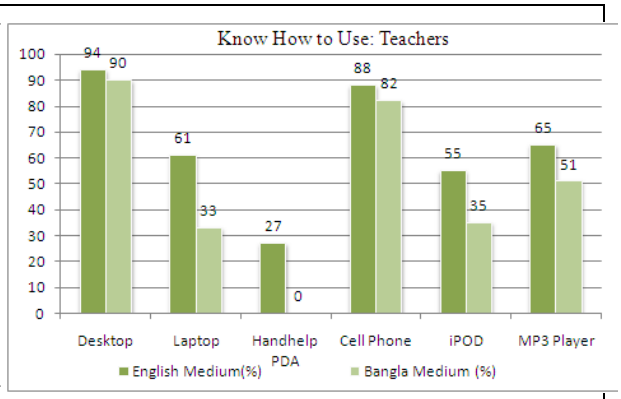

Fig. 3 Teachers' ability to use ICT devices

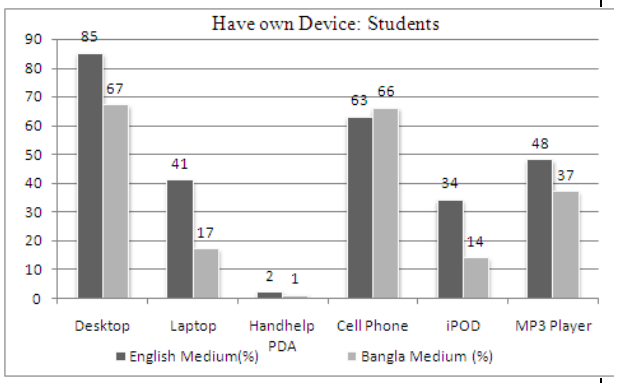

Fig. 4 Students' ownership of ICT devices

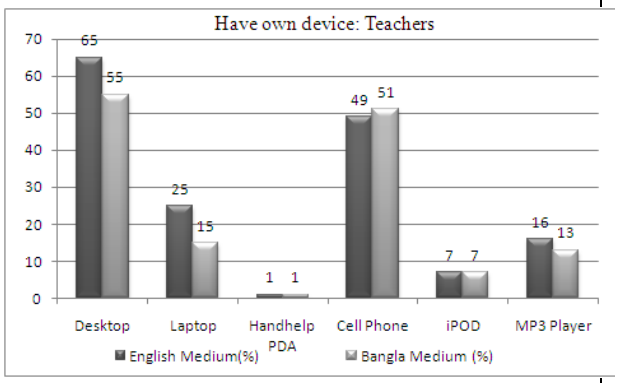

Fig. 5 Teachers' ownership of ICT devices

6.2 Digital Divide between Teachers and Students:

Having observed significant different among EM and BM teachers and students, following section analyze digital divide between teachers and students, irrespective of type of institute.

6.2.1 Ownership and Ability to 'use' ICT devices

Higher percentage of students 'own' and 'know how to use' ICT devices than the teachers (Fig. 6 and Fig. 7). This readiness might require less effort for the educational institutes to enable access to the ICT mediated educational content or administration systems.

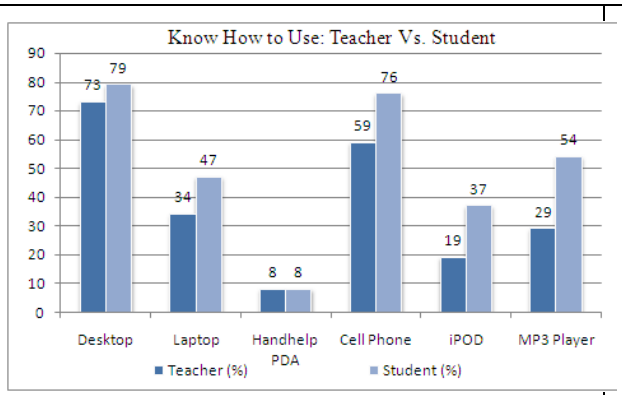

Fig. 6 Comparing percentage of ICT users

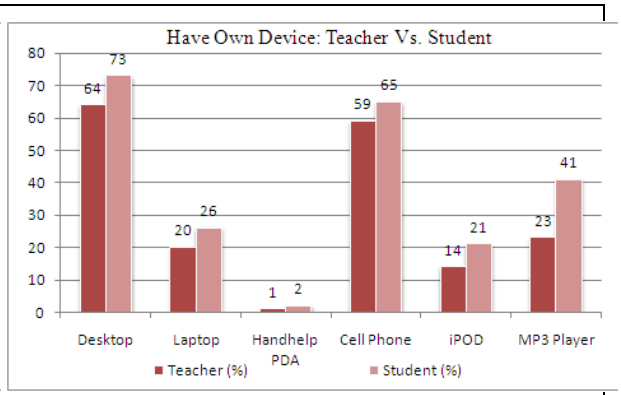

Fig. 7 Comparing percentage of ICT owners

6.2.2 *Access to Computer*

Fig. 8 shows that teachers have higher facility to use computer, at home, their academic institution or in cyber cafe. Fig. 9 shows that nearly same percentage of students use computer study. For all fun and game activities students are far ahead of teachers. About same percentage (44% and 45%) of respondents from both group use computer for study. Institution enabled learning contents might facilitate enhanced achievement of transfer of learning for both groups and increase the percentage of users to use computer for their study.

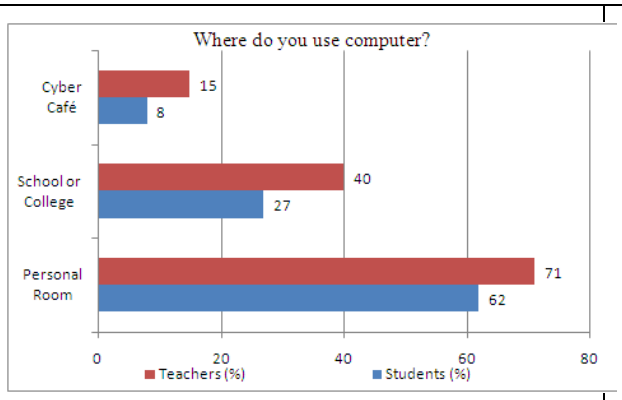

Fig. 8 Computer access locations

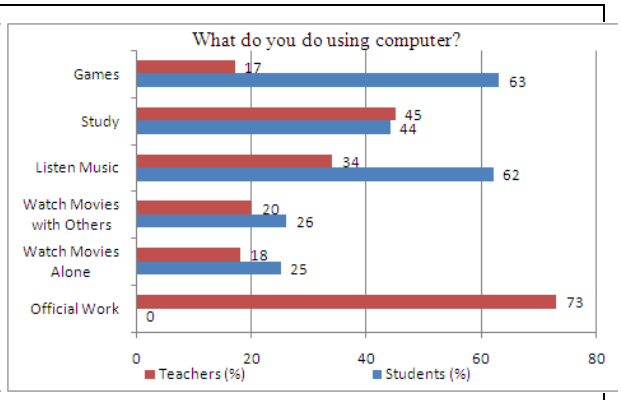

Fig. 9 Computer use behaviour

6.2.3 *Access to Internet*

Fig. 10 shows that teachers have higher access to internet at home, institute and cyber cafe. Relatively higher percentage of students never used internet (20%) compared to teachers (5%). Nearly half of the urban students and teachers have internet access in their 'own room' indicating personal level of use. About 50% of study group has high speed internet connectivity at home. Only 13% of teachers and 6% of students do not have internet connection at their home (Fig. 11). There is not much significant different in the type of connection they have at home (Fig. 11). 65% or more teachers and students use a social networking site, with highest percentage using facebook (Fig. 12). Top three online activities for students are music (53%), games (47%) and chat (42%), for teachers these are study (55%), chat (40%) and music (33%) (Fig. 13). While music and chat is common in both groups, study and games seem to dominate the difference. 55% of teachers use internet for study purpose as oppose to 31% of students.

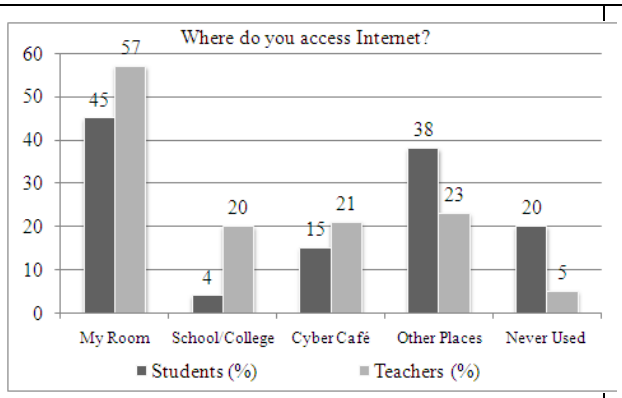

Fig. 10 Location of access to internet

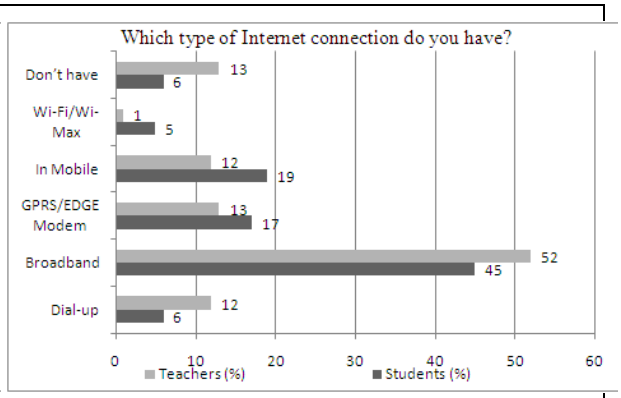

Fig. 11 Type of Internet connection

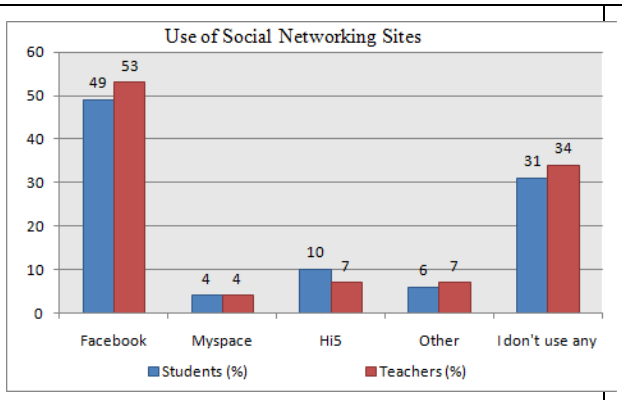

Fig. 12 Use of Social networking sites

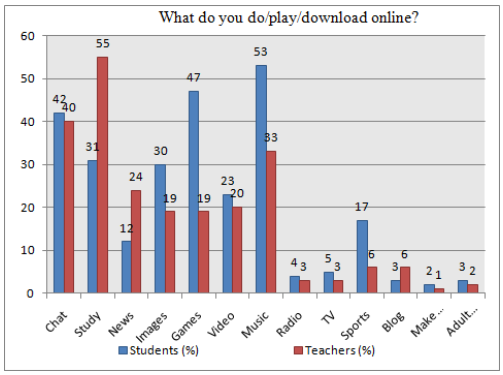

Fig. 13 Internet use

6.2.4 *Use of Mobile Phone*

Fig. 14 shows that higher percentages of students use nearly all the features of the mobile phone. In terms of ownership of cell phone SIM cards as in Fig. 15 both groups has similar pattern. It is also observed that mode of payment, i.e. prepaid and postpaid, are similar for both groups. In terms of selection of mobile operator both groups follow similar pattern as in Fig. 15. Therefore, it might be assumed that in terms of ownership and basic use of the handheld devices both groups might have similarity, but in terms of features higher percentage of students are using those.

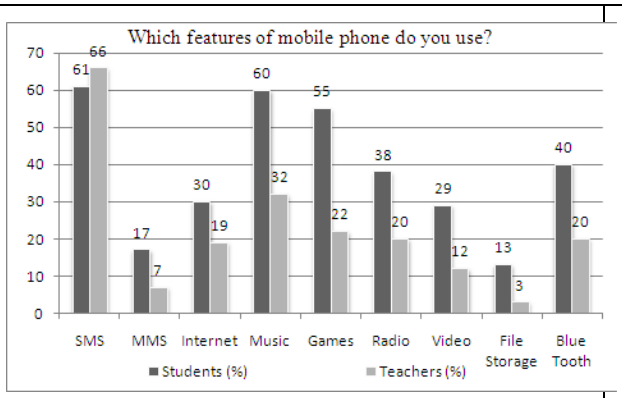

Fig. 14 Use of mobile phone features

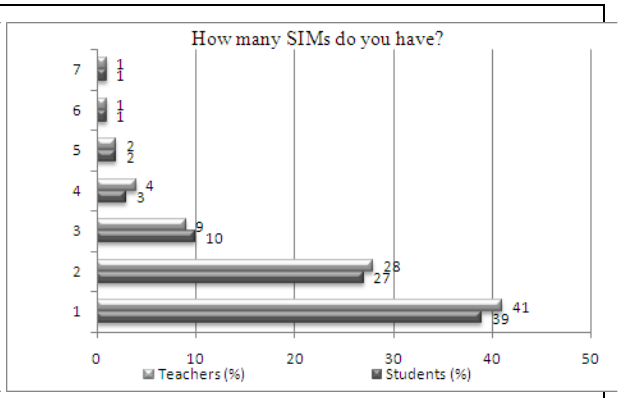

Fig. 15 Number of SIM cards

6.2.5 *Use of Radio*

Based on the interview it was found that in Dhaka, four private own FM radio channels are popularizing listening radio among the youth through music programs and late night programs with the popular singers. Same is reflected in the survey (Fig. 17). More than 50% of both teachers and student use mobile for listening radio. Only 10% or less percentage of users does not listen to radio, making this a very prospective medium for education. Students are more engaged in listening any of the national radio channels (Fig. 16). Active participation in radio programs with SMS is very low. However, there could be educational programs with quiz contest to engage students and teachers with high mobile and radio ownership and use.

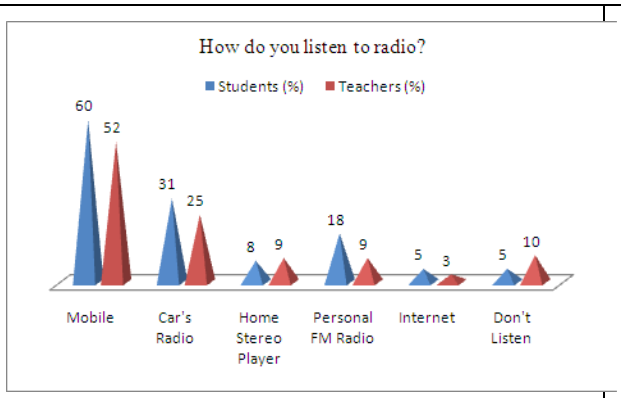

Fig.16 Radio listening device

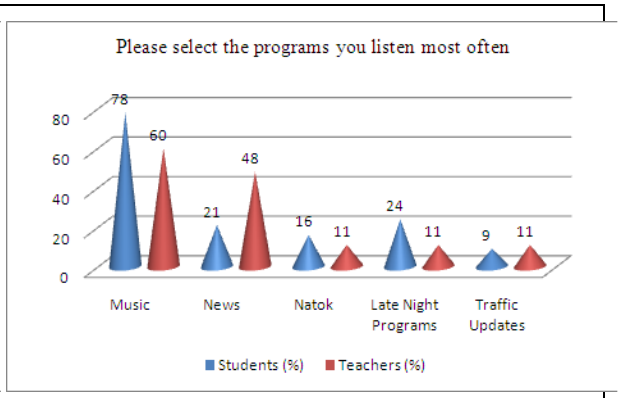

Fig. 17 Selection of radio programs

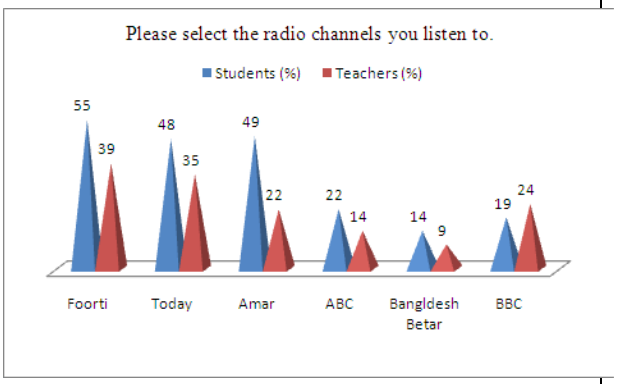

Fig. 18 Choice of radio channels

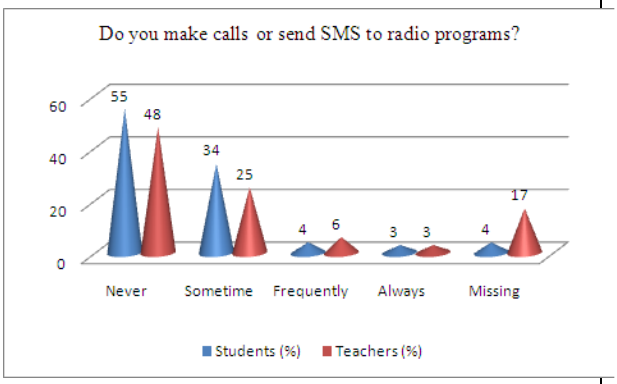

Fig.19 SMS-based participation in radio programs

6.2.6 Use of Television

Typically television viewing time among teachers is less than two hours and more for the students. News, talk shows and short movies or serials are popular among teachers. Sports programmes are equally popular among both groups. Movies, song, cartoon and reality shows are much popular among the students. Educational quiz programs with mobile and online participation scope might be attractive as well. Fig. 20 shows that 61% students and 47% have CD/DVD players with TV. This readiness can be utilized by providing video learning contents.

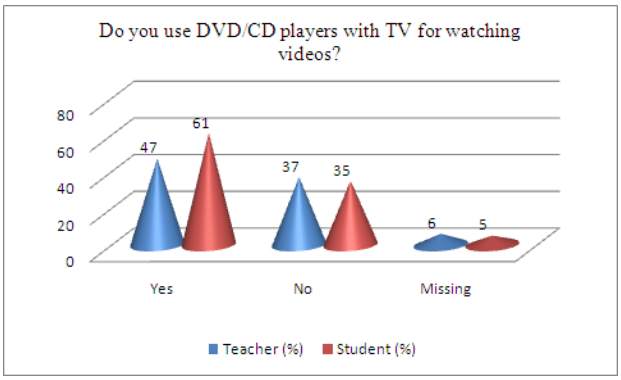

Fig. 20 Use of DVD player with TV

6.2.7 Use of Land Phone

Average number of calls made per day is 12 for teachers and 6 for students. On an average both teachers and students spend more than 30 minutes. Phones are for common use than personal and usually placed in the parents' room, dining or family living room. About 40% or more respondents do

not have a land phone or fixed phone at home. With limited functionality there is little scope for this device to be included in ICT for education.

7. CONCLUSION

The study revealed that teachers and students from the educational institutes of capital of Bangladesh do not have significant digital divide in terms of access, ownership and basic ability to use. However, there might be significant difference if the study is extended using Bloom's taxonomy's digital version [24]. In case of ability to use mobile phone features, students have higher ability to use, as opposed to teachers. Internet access and social networking site use being high in both group, academic institutes might take the benefit of making websites along with learning management systems. Very few schools in Bangladesh have web presence till date. Open source learning management systems and portfolio manager like moodle and mahara might enable the educational institutes with learning content management and academic information management. Ability to use mobile features and internet access through mobile phones might be used for academic information exchange. Decision makers of urban school and parents of students should consider their advantaged position in ICT access. It is time that "motivation" is instigated and appropriate "ability" [21] is put to use context.

Radio might be considered as one of the effective channels for educational purposes due the high percentage of access, use and electricity consumption requirements. DVD player with TV might be academically contributing if parents purchase learning contents available at the various compute markets in the country, which are created during various development projects. Programs associated with school-based telecentre [25] for the rural areas might be highly rewarding for urban educational institutes as well. School boards of trust or governing body would require much less effort than 80% of the country's population to achieve much greater.

8. SCOPE OF FUTURE WORK

This research data can be further analysed to identify digital divide between the two genders of each study groups. Scaling up would further reveal insights of divide among urban institutes of different cities of Bangladesh.

Culturally students of grade XI and XII enjoy highest liberty from the family; students of grade IX and X are also given certain flexibilities in leading personal life. Compared to Bangla medium students, students of English medium students usually come from families with higher income and social status. Furthermore, English version is a new stem with the same pedagogy and curriculum of Bangla medium. In educational institutes of Madrassa (Islamic) education and technical vocational education significant number of students come from the families of lower or lower-middle socio-economic classes. A qualitative study comprising of the these institutes' ICT infrastructure, curricular and co-curricular or extra-curricular activities, quality of connectivity and scope of exposure to innovation would enable studying the overall ICT environment of secondary and higher secondary educational institutes of urban Bangladesh. The typically perceived digital divide claimed to be due to 'age' or 'generation' gap is being found associated with social and economic reasons. It is therefore necessary to extend the study in those appropriate contexts to understand the reason behind the gap and ways to bridge.

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